

## **Clinical Evaluation of Glucosamine for Osteoarthritis and Its Science-Based Reliability**

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### **< Summary >**

Glucosamine is an amino-sugar that is obtained by acid degradation of chitin that is extracted and purified from crustacean shells and widely used in the treatment of knee or hip osteoarthritis (OA) for improvement of quality of life. In 2008, associate professor H. Kawaguchi of the University of Tokyo and his colleagues in UK and US updated and published new guidelines for the treatment of OA (OARSI) based on current science-based medicine. In the OARSI guidelines, glucosamine is listed as well as non-steroidal anti-inflammatory drugs (NSAIDs) with high quality evidences. Pathogenic mechanisms of OA have not always been elucidated but Kawaguchi *et al.* recently discovered a novel molecule named HIF2A that causes OA and is relevant to endochondral ossification. It was concluded that HIF2A was activated by NF- $\kappa$ B (nuclear factor-kappa B) that was an upstream molecule and an inhibitor of NF- $\kappa$ B was paid attention to as an OA treatment. Results of an epidemiological study for long-term effects of glucosamine on reduction of cancer incidence and total mortality that was performed by Washington University, a faculty of epidemiology, were released and published before and after the discovery of HIF2A. According to recent studies, activated NF- $\kappa$ B induces inflammation and tumor growth. In vitro and in vivo studies revealed that glucosamine has an NF- $\kappa$ B mediated anti-inflammatory activity and promotion of hyaluronic acid production in synovial cells. Moreover, a clinical pharmacological study demonstrated that human blood concentration of glucosamine was relevant to reduction of pro-inflammatory cytokines. GAIT study and GUIDE study were taken up from a number of RCTs and their efficacy and reliability of WOMAC index and Lequesne index that were used in those pivotal trials were considered. Finally latest meta-analysis of glucosamine RCTs that was published in 2010 was discussed.